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**REPORT  
OF THE  
AIR-TO-AIR MISSILE SYSTEM  
CAPABILITY REVIEW (U)**

**JULY-NOVEMBER 1968**

**APPENDIX II**

**NAVAL AIR SYSTEMS COMMAND**

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**APPENDIX II**

**REPORT OF TASK TEAM TWO**

Chairman: Mr. W.W. West, Naval Weapons Center, Corona Laboratories

"Are Fleet support organizations delivering a high quality product to the CVA's and to the forward area sites ashore?"

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INTRODUCTION

A. Task Team Two was assigned the Fleet Support area of the Air-to-Air Missile Systems Capability Review. Tabs A and B pictorially illustrate the Fleet Support (Logistics) equipments currently associated with the SPARROW and SIDEWINDER AAM weapons systems. The Fleet Support (Logistics) area problems consisted of approximately 40 discrepancies within 7 major categories. These problems (discrepancies) were distributed among such major categories as Missile Containers, Maintenance, Management, Test Equipment, Missile Testing, Quality Surveillance, Personnel Training, and Publications.

B. The major portions of the investigative review were conducted through visits to cognizant commands and activities by the Task Team Two chairman and members of the team during the period 23 August through 8 November 1968.

C. The Problem Areas assigned to the Team, both specific and general, were identified and analyzed in detail; investigative comments were recorded and documented; and conclusions and recommendations based on these analyses were formulated.

D. It is concluded that there are a number of improvements in procedures and methods which can and should be made.

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I. BACKGROUND

A. Upon acceptance of its charter Task Team Two immediately commenced active investigations into fleet support problem areas. Team members, while acting to solve the immediate Fleet support problems of current interest (in order to improve the AIM-7 and AIM-9 weapons systems capabilities in Southeast Asia) nevertheless, kept in mind the possibilities of future use of this documented information during similar circumstances.

B. As the inquiry and data collation continued, it soon became apparent that fleet support problems identified in the Symposium were not to be considered unique. A thorough and deliberate search of data associated with the current problem areas disclosed that in many cases the very same problem (perhaps varying by small degrees) had already been documented by a previously empowered study group. Five documents, covering many of the current problem areas in addition to some considered as completed, are noteworthy. They are listed as follows:

- (1) Letter Report: SPARROW III Guidance/Control Section  
Container Weatherproofing Tests Concerning:  
NAVMISCEN N3122/BD June 4, 1964.
- (2) Letter Report: FWAM-71:JHE 18 September 1964 Logistics  
and Provisioning Conference for SPARROW III  
Reusable Containers, Notes and Action items;  
Forwarding of.
- (3) Letter Report: U.S. Naval Missile Center F-4/SPARROW III  
Weapon System Team Report (U) 19 April 1966  
to 31 May 1966 (C) 50/NA 0496 18 August 1966.
- (4) Raytheon Memo: Southeast Asia Trip with the Air Force AIM-7/9  
Fact Finding Team Report (U) Raytheon Memo  
7623-1304 25 October 1967 (C).
- (5) Letter Report: Naval Air Systems Command Representative,  
Pacific SPARROW III Investigation Team Report  
(U) 11 November to 27 November 1967 Code 23A/  
RES:seb Ser 0234 December 22, 1967 (C)

C. It is interesting to note that the listed reports cover a period in time beginning in June 1964 and continue into December of 1967. The situation, therefore, spurred the team's resolve to produce an objective, truthful, well coordinated, and as technically complete a report as humanly possible within the existing time constraints. The team members have investigated, documented, drawn conclusions to, and recommended (via coordinated efforts) solutions for, those fleet support problem areas originally assigned, as well as some that were uncovered during the course of the team's inquiries, in direct response to fleet needs.

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D. The team's recommendations, if followed, should eliminate future fleet support problems of the same nature.

## II. MAJOR CONCLUSIONS AND RECOMMENDATIONS

### A. General

At the termination of the investigation period, Task Team Two reached certain major conclusions of a broad nature regarding the Fleet Support/Logistics problem areas. This section presents an overall summary of these conclusions and recommendations based on the major discrepancy categories. More detailed conclusions and recommendations of organizational, program and technical nature are presented in Tabs to this report.

It is the opinion of the team that the supporting activities can improve the quality of missiles delivered to the fleet with the implementation of the following recommendations:

### B. Management (See Tab D)

1. Better coordination is required between NAVAIRSYSCOM and NAVORDSYSCOM in providing necessary management direction to the NWS/NAD's in the area of Test, Maintenance, Logistics and Storage of Air-to-Air Missiles.

2. BUWEPS Instruction O8810.1 dated 14 June 1963 requires review, revision and reissue by NAVAIRSYSCOM. The minutes of the Logistics and Planning Conference on 18 September 1964 stated this document was then undergoing review. However, to date, no evidence of issuance is in existence.

3. Delegate, under the direction of NAVAIRSYSCOM, the in-service engineering functions for SPARROW and SIDEWINDER.

### C. Publications (See Tab E)

1. Naval Air Systems Command retain the use of the Quality Assurance Provisions (QAP) as being invaluable to Quality Assurance personnel. The QAP should remain a separate working document, but may be integrated into other manuals as desired.

2. Air-Launched Weapon QAP's be promulgated as joint NAVAIRSYSCOM/NAVORDSYSCOM publications and that NAVAIRSYSCOM establish a procedure for review and approval of preliminary drafts and revisions.

3. Naval Air Systems Command retain present SPARROW missile and support equipment publications in the current format and utilize current revision provisions to these publications. Consider only promulgation of new publications (commencing with AIM-7F and All-Up-Round) in the recently adopted format of Specification MIL-M-38784 and DOD 5220.22-M.

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4. NWS Standard Operating Procedures (SOP's) for air-launched weapons be reviewed and approved by NAVAIRSYSCOM rather than WPEC NAD Crane.

D. Containers (See Tab I)

1. NAVAIRSYSCOM issue instructions directing compliance with SPCC ltr 781/PLL/807/4423/ALM of 29 August 1968.

2. NAVAIRSYSCOM issue instructions giving authority to forward areas to use strapping material to band containers for return of components to CONUS.

3. NAVAIRSYSCOM immediately coordinate with NAVORDSYSCOM to expedite the implementation of all pertinent action items contained in enclosure (1) to Chief BUWEPS ltr FWAM-71:JHE of 18 September 1964 titled, "Logistics and Provisioning Conference for SPARROW Reusable Containers, Notes and Action Items."

4. NAVAIRSYSCOM levy requirements on the NWS's to provide refurbished containers to the forward areas as required.

5. NAVAIRSYSCOM conduct a packaging and handling study to investigate the adequacy of present techniques and material and evaluate "turnaround" vs. "throw away" containers.

6. NAVAIRSYSCOM issue instructions requiring that logbooks be taped to the G & C skin vice being placed in the container logbook compartment.

7. NAVAIRSYSCOM issue instructions downgrading the security classification of missile handbooks.

E. Test Equipment (See Tab F)

1. SPARROW shipboard test equipment be standardized. From a line maintenance, installation, and simplicity-of-operation standpoint the AN/DPM-14 test set is superior; however, a Tester Correlation Study is needed to validate the comparative performance of the DPM-7, DSM-32, and DPM-14 and to evaluate the reliability and dependability of the DSM-32 and DPM-14 as shipboard test tools. To provide standardization a directive is required specifying installation and utilization of shipboard test equipment. Procurement action as necessary should be initiated.

2. Uniform calibration criteria for SPARROW test equipment be established. The frequency and responsibility for periodic calibration and maintenance should be specified by a NAVAIRSYSCOM/NAVORDSYSCOM directive. An interim bulletin should be issued to ensure periodic on-site calibration of Naval Weapon Station AN/DPM-7 test systems by Navy calibration laboratories.

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3. A SPARROW test equipment standardization committee be reconvened for periodic review of current and proposed support equipment. Initial review should encompass NWS special support and general purpose test equipment.

4. Establish a configuration control system for SPARROW test equipment. NAVAIRSYSCOMREPS be assigned configuration and change kit control responsibility to ensure standardization and testing compatibility.

F. Maintenance (See Tab G)

A review of maintenance procedures and directives indicates that improved maintenance can be expeditiously obtained by considering the following recommendations:

1. That NAVMISCEN Point Mugu expedite investigations concerning elimination of the desiccant container and SRS crystal failure rate and that NAVAIRSYSCOM issue a directive at the earliest time based on NAVMISCEN Point Mugu's recommendations.

2. That NAVAIRSYSCOM issue a directive requiring 100% QA inspections of all air launched guided missile components being worked at the Depot and Intermediate Maintenance Levels.

3. That all levels of maintenance be directed in a manner that the total system concept is perpetuated throughout the stockpile to target sequence.

4. That immediate action by NAVAIRSYSCOM be initiated to bring the entire air launched guided missile systems into the Material Maintenance Management program (3-M) not later than January 1970.

5. A program requiring periodic proficiency inspections of NWS's be established.

6. NAVAIRSYSCOM expand the NAVMAG Subic Bay facility to include capability for intermediate G & C and rocket motor repair. Currently 31% of AIM-7E G & C's are in the repair pipeline. The Mean Down Time for missiles failing outside CONUS, as reported by FMSAEG for CY '67, is 296 days for a missile in the Atlantic area and 270 days for a missile in the Pacific area. The number of SPARROW G & C's being entered in the repair pipeline can be reduced by the establishment of a Forward Area Intermediate Repair Facility at NAVMAG Subic.

G. Quality Surveillance (See Tab H)

1. NAVAIRSYSCOM revise, update and promulgate an instruction similar to NAVORDINST 4355.3 (CH-1 of 7/15/66) to establish a NAVAIRSYSCOM program for quality surveillance of air launched guided missiles.

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2. NAVAIRSYSCOM ensure promulgation of instructions by Type Commanders and Marine Corps activities to effectively monitor the captive flight history and its observed effects upon all air launched missiles in the inventory. (These instructions should be similar to COMNAVAIR Note 8810 of 2 August 1968.)

3. NAVAIRSYSCOM revise, update, and promulgate an instruction superseding BUWEPSINST 08810.1 of 14 June 1963 to provide direction for the support of air launched missiles and associated supporting equipment.

4. NAVAIRSYSCOM supersede enclosure (2) to BUWEPSINST 08810.1 to permit across-the-board 10% sampling at the QEL of the SPARROW stockpile and further permit "stringent re-test" at the QEL of SPARROW sections rejected at the NWS as is currently provided for in paragraph 6.b.(3) and enclosure (1) of BUWEPSINST 08810.1.

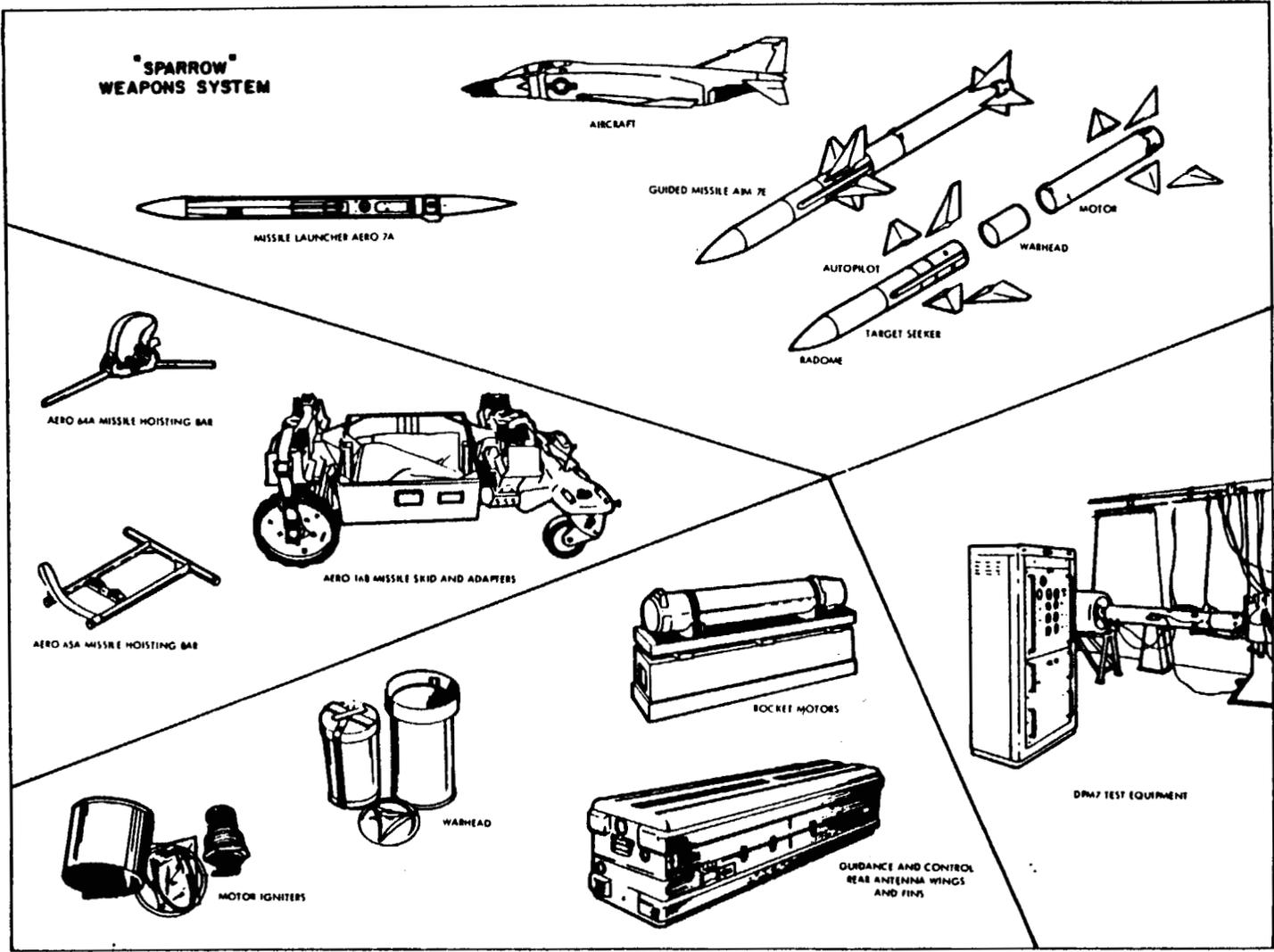
5. Currently NAVAIRSYSCOM procures SPARROW components on a one for one basis. It is recommended that NAVAIRSYSCOM adopt the following procurement requirements for the AIM-7E/TE2 to permit adequate surveillance sampling:

<u>Nomenclature</u>	<u>Units Per</u>
GC&A (including sub-assemblies) AIM-7E/TE2	1.01
Propulsion Mk-38/52	1.20
Electronic Firing Switch Mk-73	1.10
Safety-Arming Device Mk-5/35	1.10
Warhead Mk-38	1.03

6. NAVAIRSYSCOM adopt a procurement requirement for the AIM-7F and associated missile components similar to the procurement requirement recommended herein for the AIM-7E/TE2.

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**"SPARROW"  
WEAPONS SYSTEM**



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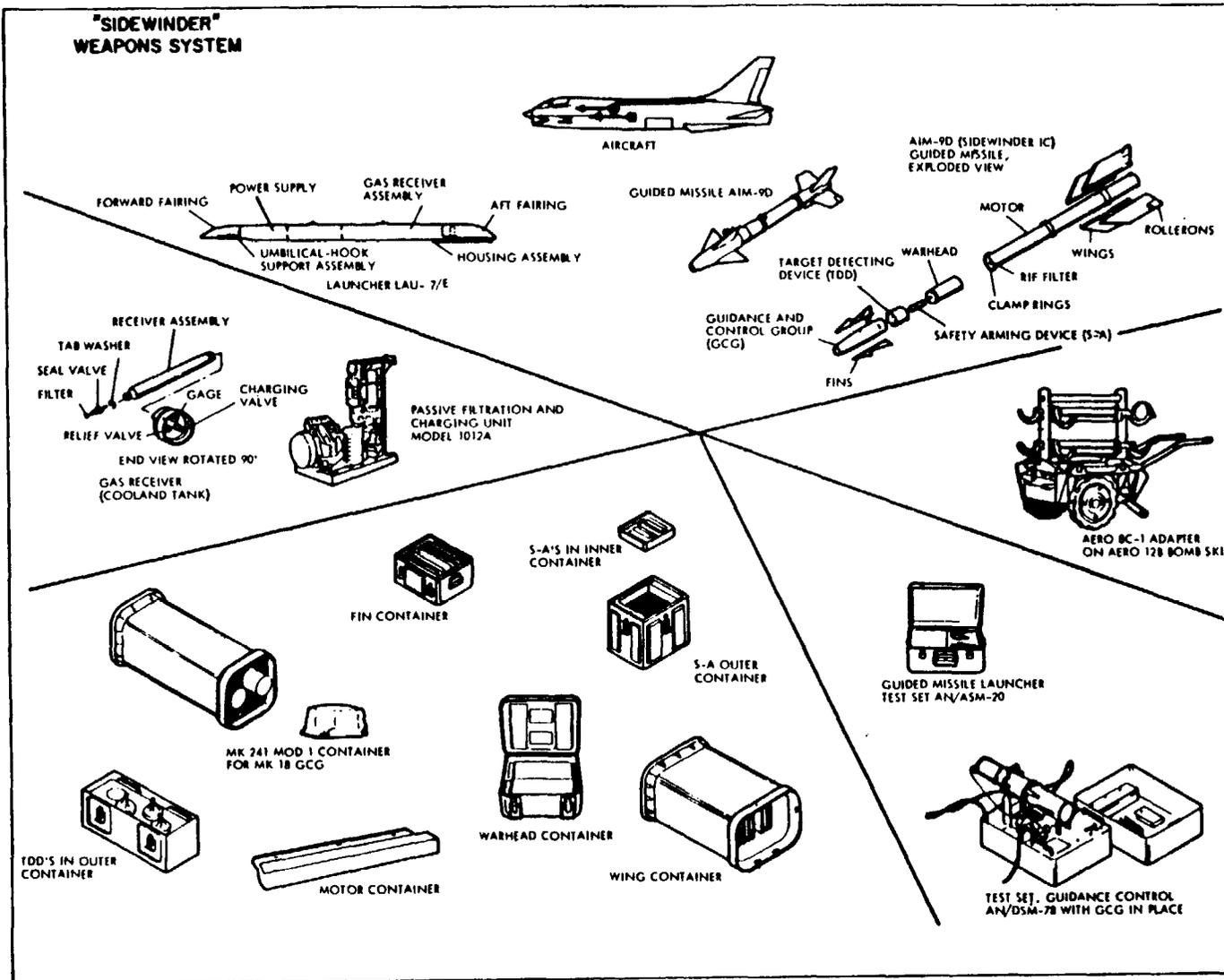
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TAB II-1

Sparrow Weapons System

**"SIDEWINDER"  
WEAPONS SYSTEM**



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Sidewinder Weapons System

TAB II-B

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## FLEET MISSILE SUPPORT

1. Fleet Missile Support should include: (1) provisioning and replenishing missiles, support equipment, and spares to Naval Weapon Stations (NWS), NAVMAG Subic, ships, training facilities, and Navy and Marine Corps Stations; (2) handling and storage of missile components; (3) maintenance and repair of missile components and support equipment; and (4) initial and follow-on training requirements.
2. The present logistics program is limited to the initial operational phase of the missiles with respect to storage and issue of the missiles, support equipment, and spares to using activities; and the handling, testing, maintenance, and repair of missiles and support equipment in quantities anticipated under restrictive conditions. It is not fully geared to the combat situation now existing in Southeast Asia.
3. The logistics support of missiles extends from the contractors' facilities to the disposal of the missiles by firing or by off-loading for redistribution and/or return to the NWS.
4. There are four operational phases: commercial, testing and storage, tactical, and training. The flow of missile components throughout these phases is shown in Figure 1. The Task Team Two Report deals only with the missile fleet support areas.

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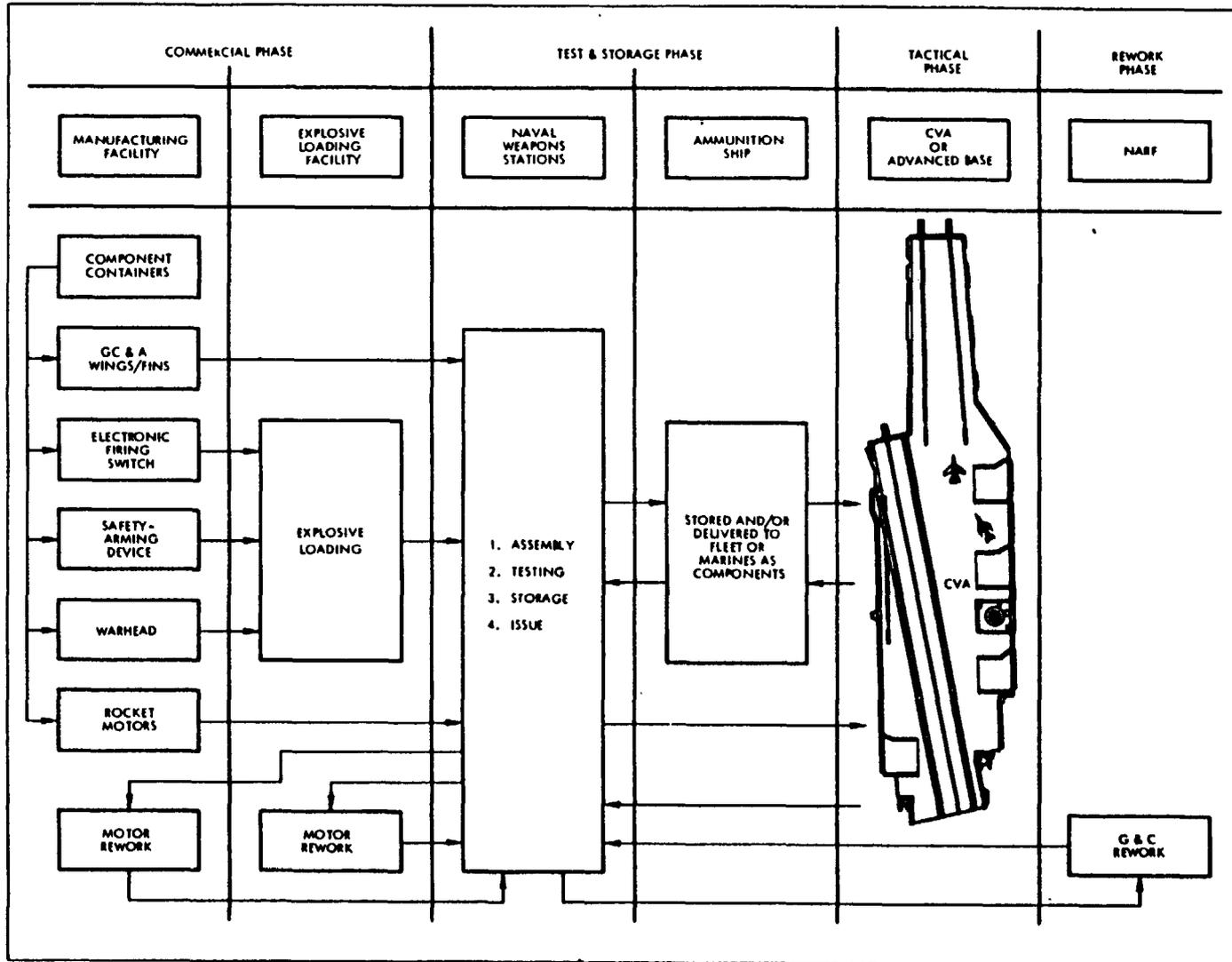


Figure 1. Typical AAM Weapons System Flow Diagram

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**TAB II-D**

GENERAL MANAGEMENT PLAN

1. The investigation of Air-to-Air Missile (AAM) problems conducted by Task Team Two at the Naval Weapons Stations (NWS) indicated a strong need for a central, responsive, and authoritative in-service engineering activity of the type provided for surface launched missiles by the Naval Ship Missile System Engineering Station (NSMSES) at Port Hueneme. The NWS's, as well as other activities, have problems associated with AAM's which could and should be solved by such an activity.
2. Offices of the Naval Air Systems Command containing the AAM program managers and other cognizant personnel are receiving fragmented information that has not been completely evaluated to the proper degree for every user. This has resulted in a degradation of authority and unauthorized assumptions of responsibility, leaving the operating forces and field activities in a position of having inadequate and confused guidance. Examples of inadequate guidance include incompatibility between NARF final test and NWS incoming test, and the lack of a central publication updating and verification authority.
3. To correct this management problem and provide a system that is workable within the present scheme, it is recommended that activities such as NAVMISCEN Point Mugu or NWC China Lake have their missions and authority expanded to include the in-service engineering services for air-to-air missiles. Implementation would provide an organization that would provide:
  - a. For including and implementing air-launched missiles in accordance with requirements of NAVAIRINST 4700.2 and the 3-M System.
  - b. For setting up the requirements for reports so that they will be of value in evaluating the entire systems.
  - c. Inspection teams and requirements that would ensure uniformity of maintenance, operations, and training throughout the Navy.
  - d. A collation point for all information that is necessary for recognizing a valid problem and implementing its correct solution.
  - e. An engineering service that can establish realistic acceptance and rejection standards.
  - f. An engineering service that can ensure documentation is up-to-date and correct.
  - g. An engineering service that can recognize a problem area before it occurs and can recommend a solution.

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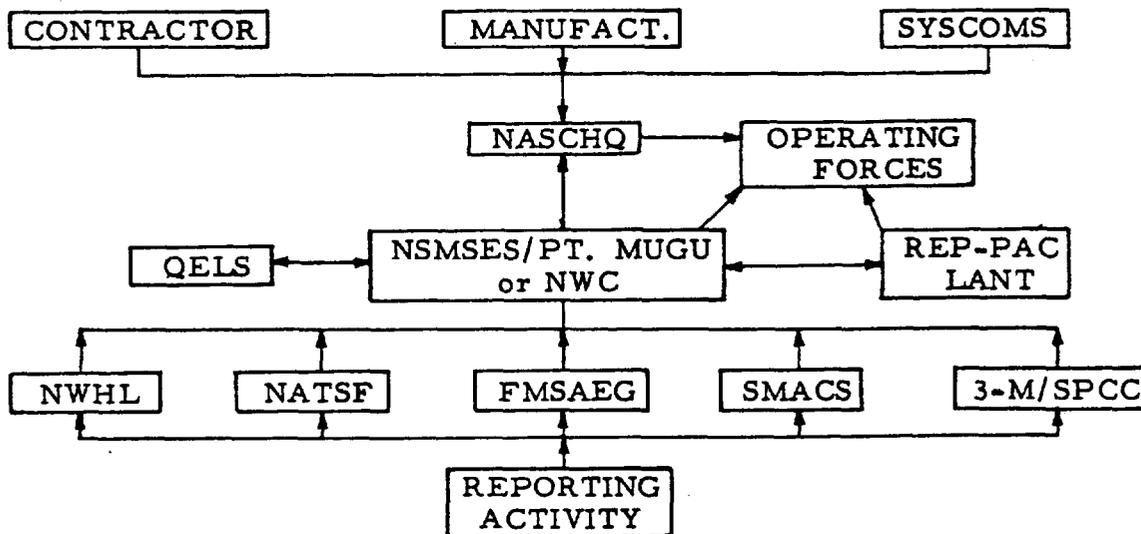
h. An overall surveillance program that is coordinated and meets its objectives.

i. NAVAIRSYSCOMHQ with information that has had all superfluous data deleted, and recommendations for action that would be factual in nature.

4. The in-service engineering activity should have responsibility and authority for maintaining the data package, providing engineering support and direction to participating field activities, reviewing and approving/rejecting class II changes, reviewing and recommending action on class I changes, and maintaining configuration control. The in-service engineering activity would also review all collected data (Material Maintenance Management Program (3-M), UR's, FMSAEG, Serialized Missile Accounting and Control System (SMACS)) and make recommendations, or take action, based on engineering analysis of the data.

This type of in-service engineering organization could be implemented at a minimum cost since the directives for the creation already exist (NAVAIR 4700.2 Inst. Naval Aircraft Maintenance Program Changes) and there are at least two field activities (NAVMISSCEN, Point Mugu and NWC, China Lake) where this capability currently exists, which could assume the task with a minimal increase in manpower and funding.

An organizational illustration (below) depicts the major commands and their interface. This organization presently exists within the Command System and should be identified by directives and provisions made for funding.



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PUBLICATIONS

1. During the period 23-26 September 1968, a conference was held at the Naval Weapons Center, China Lake, to review SIDEWINDER AIM-9D Weapon Systems Technical Manuals. Enclosure (1) of reference (e), (Tab J), contains the minutes of this conference. The committee has reviewed the above where applicable to the Fleet support activities area and, on the whole, concurs with the efforts, conclusions and recommendations of the conference. However, it should be noted that the committee definitely does not endorse the cancellation of the Quality Assurance Provisions (QAP).
2. The QEL organization at NWS Seal Beach includes a technical documentation group which is responsible for the initial preparation and continual up-dating of QAP's. QAP's are standardized inspection documents for use by Quality Assurance personnel at the NWS's, NAD's and other ordnance facilities during the processing of all Navy and Marine Corps ordnance except the Fleet Ballistic Missile. QAP's are available for all air-launched missiles and are up-dated whenever the need arises.
3. QAP's directly influence the maintenance of proper quality and reliability criteria for complex weapons through provision of standardized and realistic inspection requirements. They provide a continuous source of feedback data on the condition of ordnance received from contractors and on the effects of handling, storage, and shipboard environments. The results of inspections employing these documents are used by NAVAIRSYSCOM and its representatives (such as FMSAEG, QAO, NAVAIRSYSCOMREPLANT and NAVAIRSYSCOMREPAC) as the basis for withholding material from issue, changing test requirements, improving designs and processes, etc.
4. All existing air-launched weapon QAP's are identified as NAVORD publications and are not signed off by NAVAIRSYSCOM. It is recommended that future air-launched weapon QAP's be promulgated as joint NAVAIRSYSCOM/NAVORDSYSCOM publications and that NAVAIRSYSCOM establish a procedure for review and approval of preliminary drafts and revisions. Except for the above changes it is further recommended that the system now in effect for preparing and up-dating air-launched weapon QAP's be continued in its present form. Investigation by Task Team Two disclosed that this system is most efficient and that the QAP's do serve a real requirement.
5. Members of the committee associated with quality assurance and liaison performed by the committee with Fleet support personnel performing quality assurance work indicate that the QAP's are necessary and invaluable to assure the highest acceptable level of quality of missile components be provided to the Fleet.

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6. Other publications, SOP's (Standard Operating Procedures), are being prepared as required by the NWS's and other air-launched missile processing activities. SOP's include engineered performance standards and material flow plans in addition to tool, equipment, manpower, facility and method requirements. These SOP's, which vary in procedural instructions depending on the originating NWS, are submitted to WPEC NAD Crane for approval. These SOP's constitute a valuable management tool and have a significant effect on the quality, reliability, and uniformity of air-launched weapons. It is, therefore, recommended that SOP's for air-launched weapons be reviewed and approved by NAVAIRSYSCOM rather than NAD Crane, thereby standardizing operating procedures at the Fleet support facilities. The QEL technical documentation group at NWS Seal Beach has informally proposed that it be designated to act for NAVAIRSYSCOM in this capacity. This assignment would be in line with other technical documentation responsibilities assigned to that group and could therefore be accomplished with minimum additional effort.

7. A similar conference was held at the Raytheon Company, Lowell, Mass., on 4 September 1968, during which time technical manuals for the SPARROW Weapon System were discussed. Much of this conference was centered around an involved integration and consolidation of some SPARROW manuals, and with the rewriting of all SPARROW manuals in accordance with Specification MIL-M-38784 and DOD 5220.22-M. Several manuals to be revised are concerned with the AIM-7C, AIM-7D and AIM-7E versions of the missile and with the AN/DPM-7, AN/DPM-14 and AN/DSM-32 Test Equipments.

8. As a result of NAVAIR findings and subsequent CNO action, directives have been issued to: (1) dispense with reworking the AIM-7C at the NARF and (2) AIM-7C expenditures in the Fleet squadrons are not to be counted against the squadron annual training allowance. In short, the AIM-7C will soon be removed from the inventory. The AIM-7D missiles are currently expended in Fleet training exercises and will be used only in lieu of the AIM-7E until such time as the AIM-7E is available in sufficient inventory quantities. Thus, the days of the AIM-7D are, also, numbered in the inventory.

9. As indicated in another section of this report, retention of the above SPARROW Test Sets is contingent on progress made with the All-Up-Round (AUR). In addition, support equipment for these equipments will also, of course, become obsolete.

10. The team also questions the validity of combining Technical Manuals, Volume I, Theory of Operation, and Volume III, Schematic Diagrams for the AIM-7C, 7D and 7E SPARROW. It is recommended, however, that consideration be given to combining such manuals beginning with the AIM-7F.

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TAB II-E

11. In view of the above, Task Team Two is of the opinion that it is neither practical, necessary nor economically sound to direct efforts towards revision of the current family of AIM-7C, 7D and 7E SPARROW publications. Should it be concluded that publications should be prepared to meet Specification MIL-M-38784 and DOD 5220.22-M, it is the committee's recommendation that only new publications beginning with future missiles (such as the AIM-7F) and Test Sets (such as the AUR Test Set) be effected.

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TAB II-

TEST EQUIPMENT

1. A limited correlation/compatibility study was initiated to determine the reliability and repeatability of the AN/DPM-7, AN/DPM-14, and AN/DSM-32 test equipment. Data obtained are pertinent to type of test set to be utilized aboard CVA's. In accordance with NAVAIR policy concerning testing criteria at the shipboard maintenance level, this review was confined to the AN/DPM-14 and AN/DSM-32.

2. The following comparative criteria were developed to determine the merits of each unit for shipboard testing requirements:

a. The AN/DSM-32 is presently installed on nine CVA's in commission for testing AIM-7D/E Guidance and Control sections. With the onset and partial acceptance of the so-called shipboard NO TEST program, attention to maintain, use and modify the AN/DSM-32 has decreased over the past two years. To assure operational availability, refurbishment (including incorporation of applicable SEC's, including AIM-7E-2 capability) will be required. Funds and lead time involved are unknown at this time. There are six AN/DPM-14 units currently available to NAVAIR which have test capabilities similar to the AN/DSM-32. Funds have been obligated to update the DPM-14 to include AIM-7E-2 capability, and modifications are currently being installed. A Navy contract has been awarded for the procurement of ten additional AN/DPM-14 units for the Marine Corps. These ten will have AIM-7E-2 capability installed when delivered.

b. Test Capability

(1) AN/DSM-32 - A support equipment change is required to provide AIM-7E-2 test capability. The contractor has not been requested to prepare an engineering change proposal. It is estimated the approximate cost for the basic kit would be \$4000. This price does not include installation cost or updating to latest configuration (SEC's and EMC's).

(2) AN/DPM-14 - Will test AIM-7D/E. SEC 1389 is being incorporated in fleet units to reflect test capability for the AIM-7E-2. New production units will have this capability.

c. Test Parameters

(1) AN/DSM-32 - Provides a broader scope in test parameters, including testing of HOJ-and Oil Time which are not incorporated in the AN/DPM-14. Other functions separately tested on this unit are indirectly tested on the AN/DPM-14. Table (1) provides a comparison chart of test parameters for the three basic SPARROW test sets.

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(2) AN/DPM-14 - A review of FMSAEG test reports indicates that this tester will detect the major parameters of missile failure reported by fleet activities. A more comprehensive report will be available, however, upon the conclusion of the correlation/compatibility study.

d. Maintenance and Calibration

(1) AN/DSM-32 - Requires weekly and monthly testing performed by trained technicians. Organizational level operation and maintenance training only is available for missile department personnel. Periodic on-site alignment, repair, and calibration is being provided by field teams from the Naval Air Rework Facilities, Alameda and Norfolk.

(2) AN/DPM-14 - Portable, thereby facilitating repair and calibration on an exchange basis. Intermediate level maintenance could be assigned to the shipboard AIMD and performed in the appropriate electronics area. Under this concept operator training and skill level could be minimal for missile testing.

e. Installation

(1) AN/DSM-32 - Requires space allocation for fixed installation. Only two carriers not equipped with this unit. Two test sets required per CVA to preclude extended loss of capability due to unit failure.

(2) AN/DPM-14 - Fixed installation not required. Location of checkout area can be changed without a ship alteration.

f. A combination test installation was also reviewed: the electronics package of the AN/DPM-14 and the AN/DSM-32 test stand and hydraulic unit. The major advantage is a reduction in acquisition cost and procurement lead time as the AN/DPM-14 hydraulic units are long lead time items. The use of dual maintenance publications to support this combination is the prime disadvantage.

3. Recommendations

From a field maintenance, installation (excluding initial cost) and simplicity of operation standpoint, the AN/DPM-14 is the most desirable tester for shipboard utilization; however, insufficient data are available to establish its performance as adequate to the task of identifying valid GO missiles.

Information was not available to compare the performance of test sets to prediction of SPARROW kill rate other than through a look at test functions and high missile failure parameters. The AN/DSM-32 appears

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TAB II-

superior for minimum performance testing; however, an in-depth Tester Correlation Study is needed to validate comparative performance, dependability and reliability. It is recommended that the NAVMISCEN Pt. Mugu undertake this task.

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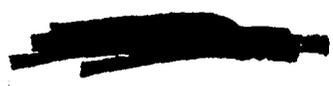
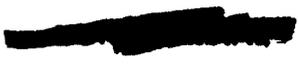


Table 1. Comparison of Test Parameters of the Sparrow Test Sets (Sheet 1 of 5)

<u>AN/DSM-32</u>	<u>AN/DPM-14</u>	<u>Failure Percentage</u>
1. Auto Tune	Auto Tune	62
2. Head & Hub Oil Time	No	3
3. Low Lock	No (Fixed Set)	6
4. Re-Lock	Re-Lock	1
5. Range Arm Fuze	Range Fuze	1
6. Wing Lock Time (ETD)	Wing Lock Time (ETD)	
7. English Bias	No	1.5
8. Integrator Drift	Accelerometer	2
9. Accelerometer Gain	Accelerometer	4
10. Roll Gyro Gain (C Alt)	Roll Gyro (C Alt)	1.5
11. High Lock	No	-
12. Head Drift	Radar Track (A Alt)	7
13. Autopilot Sen	Radar Track (A Alt)	4
14. HOJ	No	0.6
15. Craft Gyro Gain	Craft Gyro Gain	1
16. Head Stabilization	Systems	1.4
17. No Voltage Check	No Voltage Check	0
18. EPU Run Down Time	EPU Run Down Time	
19. Squib MEAS	Squib MEAS	0
20. Head Press Switch	No	



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Table 1. Comparison of Test Parameters of the Sparrow Test Sets (Sheet 2 of 5)

TESTING STATUS OF 654 SPARROWS

<u>Type of Defects</u>	<u>Step Failed</u>	<u>Percentage</u>
Auto Tune	1	62
Front & Rear locking sensitivity		
Head & Hub oil time	2	3
Low Lock	3	6
Re-Lock	4	1
Doppler fuze operation	5	1
Short Sweep	6	3
Electronic time delay	7	1
English bias	8	1.5
Integrator balance	9	2
Accelerometer gains	10	4
Roll gyro gains	11	1.5
High Lock	12	0
Head drift	13	7
Radar Gains	14	4
HOJ	15	0.6
Craft Gyro Gains	16	1
Head stabilization	17	1.4
Squib circuit measurement	18	0
No voltage check	19	0

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Table 1. Comparison of Test Parameters of the Sparrow Test Sets (Sheet 3 of 5)

DPM-14, DPM-7, and DSM-32

<u>DPM-7 NARF/NWS/NAS</u>	<u>DPM-14 AF/Marines/Navy</u>	<u>DSM-32 Navy/Shipboard</u>
1. Auto Tune	Auto Tune	Auto Tune
2. Head & Hub Oil Time	NO	Head & Hub Oil Time
3. Lo Lock	NO (Systems)	Lolock
4. Relock	YES	Relock
5. Range Arm Fuze	Range Fuze	Range Arm Fuze
6. Short Sweep	NO	NO
7. Wing Lock Time (ETD)	Wing Lock Time (ETD)	Wing Lock Time (ETD)
8. English Bias	NO	English Bias
9. Initial Eng. Bias	NO	NO
10. Integrator Drift	Accelerometers	Integrator Drift
11. Accelerometer Gains (A-Alt)	Accelerometers (C-Alt)	Accelerometer Gains
12. Roll Gyro Gains (C-Alt)	Roll Gyro (C-Alt)	Roll Gyro
13. High Lock	NO	High Lock
14. Head Drift (A-Alt)	Radar Track (A-Alt)	Head Drift
15. Radar Gains (A-Alt)	Radar Track (A-Alt)	Autopilot Sens & Head Control Dynamics
16. HOJ	NO	HOJ
17. Craft Gyro Gain (C-Alt)	Craft Gyro Gain	Craft Gyro Gain
18. Head Stabilization	YES (In a Sense)	Head Stabilization
19. No Voltage Check	No Voltage Check	No Voltage Check
20. Squib Measurement	Squib Measurement	Squib Measurement
21. EPU Run Down Time	EPU Run Down Time (Air Force only)	EPU Run Down Time
22. Head Pressure Switch	NO	Head Pressure Switch

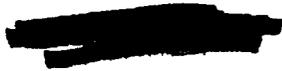


Table 1. Comparison of Test Parameters of the Sparrow Test Sets (Sheet 4 of 5)

OPERATIONAL CHECKOUT OF AIM-7E USING THE VARIOUS TEST SETS

Step No. AN/DPM-7	Test Name	Missile Functions or Circuits Tested	Comparable Test On:	
			DSM-32	DPM-14
1.	Auto-Tune Front and Rear Locking Sens	Front and Rear Receivers, Klystron Local Oscillator and Speedgate	1.	1.
2.	Head and Hub Oil Time	Front Antenna and and Wing-Servo Hydraulics	3.	None
3.	Low Lock	Speedgate and Sweep Control Circuits	4.	None
4.	Re Lock	Speedgate and Sweep Control Circuits	5.	None
5.	Doppler Fuze Operation	Speedgate and Fractional Doppler Gate	2.	9.
6.	Short Sweep	Sweep Control Circuits	None	None
7.	Electronic Time Delay	Autopilot and Wing Servo Circuits	6.	3.
8.	English Bias	Autopilot Circuits	12.	None
9.	Integrator Balance	Autopilot Circuits	8.	7.
10.	Accelerometer Gains	Autopilot Circuits	9.	5.
11.	Roll Gyro Gains	Autopilot Circuits	7.	6.
12.	High Lock	Speedgate	13.	None
13.	Head Drift	Head Control Circuits	13.	7.
14.	Radar Gains	Autopilot Circuits and Guidance	14 & 15	7.
15.	HOJ	Wideband Tracking Loop	16.	None
16.	Craft Gyro Gains	Autopilot Circuits	10.	4.
17.	Head Stabilization	Head Control Circuits and Hydraulic Servo	11.	None

TAB II-F

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Table 1. Comparison of Test Parameters of the Sparrow Test Sets (Sheet 5 of 5)

<u>SEEKER SECTIONS</u>	<u>DSM-32</u>	<u>DPM-14</u>
Autotune	31/38	68/124
Head Drift/Radar Track	1/38	3/124 19/124 13/124
System Failure	Head Hard Over Wings Hard Over Wings Dead	9/24
Fuze Fire	1/38	6/124
Range Arm	1/38	
Autopilot Error	4/38	
Range Arm		5/124
Head Oil Time	1/38	
<u>CONTROL SECTIONS</u>		
Autotune	30/36	
Roll	5/36	2/36
Acceleration	1/36	8/96 6/96
Int. Drift		
Craft		5/96
EPU		10/36
ETD		1/96

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## MAINTENANCE

1. Approximately 31% of the SPARROW G & C inventory in SEA is reported monthly as being non-RFI. The Mean Down Time (MDT) for rejected G & C units outside West Coast CONUS, as reported by FSMAEG, is 270 days.
2. To reduce the MDT and the number of missiles in the repair pipeline, it is recommended that a forward area repair facility be established to operate as a limited maintenance facility with capability to repair certain more frequently occurring failures and to eliminate the return of "false rejects" to the NARF. By locating this facility close to operational users, administrative and shipment costs to CONUS, the number of missiles currently in the Navy repair pipeline, and the process and repair time for missiles will be substantially reduced. In addition to the primary function of the site, informal on-the-job-training can be provided for Navy personnel in proper operating and troubleshooting procedures using the AN/DPM-7. This informal training can be accomplished without affecting normal Forward Area Intermediate Repair operation or staffing requirements.
3. Preliminary investigation has disclosed that certain excess Government assets, adaptable to use at this facility, are presently in storage in Raytheon warehouses awaiting Government disposition. Although this equipment will require modification and/or refurbishment, the lead time is much shorter than that for new equipment of similar capability.
4. The Contractor could assist the Navy in a program to establish a forward area repair facility with a capability to repair only those critical components of the AIM-7 Guidance and Control Section listed below and to eliminate the return of false rejects of the AIM-7 Guidance and Control Section to NARF. This facility could build up to a capability to receive one hundred eighty (180) missiles with an ultimate yield of one hundred (100) missiles per month.
5. The major items to be replaced at the forward area repair facility are as follows:
  - a. Klystron and associated parts; i.e., Klystron Motor, Coupler, and associated nominal resistors and capacitors.
  - b. Elements of the D. C. power supply, including transistors and associated nominal resistors and/or capacitors.
  - c. Electronic Time Delay Module.
  - d. Electric Power Unit - to be cycled back to factory for repair.

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e. Head Rate Gyro and heater assembly and associated nominals.

f. Accelerometers.

6. AIM-7E G & C Inventory (World Wide)

31 July 1968

3904 of which 1003 reported to be non-RFI.

31 August 1968

3927 of which 1183 reported to be non-RFI.

30 September 1968

3864 of which 1264 reported to be non-RFI.

MEAN DOWN TIME\* FOR REJECTED SPARROW III TSG/FCG COMBINATIONS CY '67

	<u>Total Rejects by Field Activities</u>	<u>MDT Prior to Receipt at NWS</u>	<u>Rejects Confirmed by NWS</u>	<u>MDT From NWS Thru O&amp;R to NWS</u>	<u>Sections Received at NWS From O&amp;R</u>
<u>East Coast</u>					
Outside CONUS	58	203	40	93	26
Inside CONUS	64	29	51	136	31
<u>West Coast</u>					
Outside CONUS	697	108	596	162	218
Inside CONUS	15	106	10	273	6

\*Mean Down Time (MDT) is reported in days.

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**TAB II-6**

SEA G&C INVENTORY - AIM-7E

CVAs	JAN 68	FEB 68	MAR 68	APR 68	MAY 68	JUN 68
-43	162(22)	133(2)				
61	195(31)	193(58)	190(35)	168(23)		
63	224(12)	228(3)	228(5)	222(15)	222(15)	222(55)
65	246(6)	246(31)	246(31)	155	148(6)	148(6)
66					220	221
64						223
All AEs	251(15)	279(15)	195(7)	115	165	215
NM Subic Bay	215 (190)	145 (126)	323 (300)	508 (487)	365 (340)	526 (433)
H&MS-11&13	205(12)	198(26)	198(36)	167(37)	167(63)	231(70)
In Transit	51					
Total SEA (7E)	1549 (288)	1422 (261)	1380 (414)	1335 (562)	1287 (424)	1786 (564)

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QUALITY SURVEILLANCE

1. Quality Surveillance is generally assumed to include data from the NWS QEL, QA, NARF, ship and shore stations tests, and from squadron operational reports. This section of the report is concerned with the air-launched missile surveillance program as it is currently defined. NAVORDINST 4355.3 (CH-1 of 7/15/66) (formerly BUWEPSINST 4355.29 of 15 April 1966) promulgates a quality surveillance program for Navy guided missiles and provides basic guidelines of implementing quality surveillance programs on guided missile systems, missile subassemblies and ancillary equipment. The instruction is applicable to and assigns implementing responsibility for those Naval activities cognizant of missile storage, assembly, check-out, repair and operational use. Chart One is a visual presentation indicating possible NAVORDSYS COM field activity participation in the air-to-air missile surveillance program.

Chart 1. Naval Weapons Field Activity Participation in Air-to-Air Guided Missile Quality Surveillance Programs

DESIGNATED ACTIVITY  PROGRAM AREA	FMSAEG	NAD Crane (QEL)	WPNSTA Concord (QEL)	WPNSTA Concord (GMSD & QA)	NAVORDSTA Indian Head	WPNSTA Seal Beach (QEL)	WPNSTA Seal Beach (AWD & QA)	NAD Oahu (QEL)	NMEF Yorktown (QEL)	WPNSTA Yorktown (FMSD & QA)
Missile Round	X			A			A			A
GC & A			X	A		O	A		O	A
Fuzes and Connecting Cables		X	O	A		O	A		O	A
Warheads		O	X	A		O	A		O	A
Propulsion and Gas Generators			O	A	X	O	A		O	A
Telepacs			O			O			X	

Legend: X, Coordinary Activity  
 O, Participating Activity  
 A, Assisting Activity

2. Enclosure (1) of NAVORD letter ORD-004:WSK of 8 March 1967 provides a general plan for implementation of the air-launched guided missile round quality surveillance program. The program is to be administered by several Coordinating Activities that are responsible for major missile subassemblies and components and by one Missile Round Group (FMSAEG), which is to have overall responsibility. Each Coordinating Activity is to have central cognizance over operations of a portion of the program. Participating Activities peripheral to each Coordinating Activity may assist in performing special tests on components when such tests are within their capability and resources. The Participating Activities are to have the responsibility of making initial analyses and interpretations of data which each generates.
3. FMSAEG references (ad) and (ae) of Tab J are examples of promulgation of the coordinated efforts (under a single cover) of the above activities, depicting the missile round serviceable quality estimate utilizing all available data. However, it should be noted that promulgation of these reports has not been timely and efforts should be intensified to correct this deficiency.
4. Of special interest, however, is the fact that the above documents have been prepared under NAVORDSYSCOM instruction. To date, no official direction from NAVAIRSYSCOM has been promulgated either in support of or differing with the existing NAVORDSYSCOM requirements. This requirement from NAVAIRSYSCOM is urgently and immediately needed to assure that the missile round materials in storage and service use will have adequate quality and serviceability. It is, therefore, recommended that the Naval Air Systems Command provide instructions implementing a Quality Surveillance program for all air-launched missiles.
5. To ensure complete missile component surveillance, positive identification of each missile component must be maintained throughout its service life. NAVAIRSYSCOMHQ message R162323Z of Feb 1968 directed that data be collected on all air-launched missile components and that, following accumulation of 125 captive flights, the component be removed from service. COMNAVAIRPAC Note 8810 of 2 August 1968 promulgated the special provisions of the Air-Launched Guided Missile Weapon Systems Performance Data Reporting Program (established by BUWEPSINST 8810.2) for collection of these data in the Pacific Fleet. A sizeable amount of these data have been reviewed and processed at FMSAEG to date and special reports have been published for use in monitoring component captive flight history. Unfortunately, no similar direction to collect these data has yet been promulgated from COMNAVAIRLANT nor from Marine Corps activities. It is recommended that these directives be promulgated immediately to provide a complete component history of all air-launched missile components from all fleet users.

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6. BUWEPSINST 08810.1 of 14 June 1963 was promulgated to provide information and guidance to the Fleet and Naval Weapons Shore Establishments and provides direction in matters of policy, planning and general operating procedures for support of air-launched missiles and, to some extent, associated supporting equipment. The instruction provides direction in the following areas of air-launched missile support:

- a. Air-Launched Missile Issue Control and Coordination
- b. Air-Launched Missile Facilities
- c. Quality Surveillance and Stockpile Evaluation
- d. Maintenance
- e. Shipping Containers
- f. Field Service
- g. Alterations and Modification Policy
- h. Repair Parts
- i. Fleet Return of Material
- j. Reports

7. Review of the above listed areas as it applies under the purview of Task Team Two (i.e. NWS, QEL, etc.) indicates that the instruction is in need of revision and re-issue by NAVAIRSYSCOMHQ due to changes in requirements or lack of direction since 1963 in some areas.

8. For example, Interim Air-Launched Missile Bulletin No. 54 (IALMB-54) was published in view of the fact that certain NAVAIRSYSCOM and NAVWEPS documents and BUWEPS 08810.1 were conflicting in directions to the Fleet relative to shipboard testing and inspection. Although IALMB-54 supersedes and resolves conflict in this singular area, other out-dated policies or problem areas resulting from conflicting documentation still remain unresolved.

9. In another aspect of the existing surveillance program, BUWEPSINST 08810.1 directs that the QEL shall:

"Provide a monitoring service to determine the adequacy of the checkout and test program, both by a stringent recheck of rejected missiles as well as random and periodic sampling."

It is obviously the intent of the above that this stringent monitoring be applicable to both the SPARROW and SIDEWINDER missiles. However, it should be noted that at present, this monitoring is performed only in the case of SIDEWINDER. No investigative analyses are currently conducted on a routine basis of rejected SPARROW G and C sections. Current SPARROW analyses by the QEL consist solely of misfire diagnoses and diagnoses of G and C sections rejected during prosecution of NAVAIRSYSCOMHQ special project entitled the "Performance Evaluation Program" (PEP). Established in 1965, by authority of BUWEPSINST 8810.6 and, although very limited in scope, to

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monitor quality of the NARF rework process through a sampling of each NARF quarterly output, the failure diagnoses of rejected PEP missiles by QEL Concord have been extremely beneficial and invaluable in detecting missile rework differences and deficiencies. (For further details concerning prosecution of and sample results arising from the PEP program, refer to such FMSAEG reports as FMSAEG Technical Memorandum E-5-790). Enclosure (2) of BUWEPSINST 08810.1 does not require the "stringent re-test" at the QEL for rejected SPARROW sections as is required in enclosure (1) of BUWEPSINST 08810.1 for the SIDEWINDER.

10. In view of the above, it is obvious that quality assurance and surveillance procedures and practices for all air-to-air missiles require standardization. Promulgation of a revised version of BUWEPSINST 08810.1 reflecting the requirements of the real world today should result in an improvement in the overall quality, reliability and effectiveness of air-to-air missiles.

11. Perhaps two reasons for the apparent differences in the surveillance programs of the SPARROW and SIDEWINDER are due to the procurement policies and subsequent available assets of the separate missile components. The SPARROW missile G and C and its associated components (i.e. warhead, electronic firing switch, rocket motor, safety-arming device) are purchased on a one-for-one basis. That is, the same total number of components are purchased for each G and C procured. Thus any destructive surveillance or test of missile components result in unacceptable reduction in inventory. The SIDEWINDER GCG and associated components are not purchased on a one-for-one basis, thus the across-the-board 10% sampling of the SIDEWINDER stockpile can be supported. The result has been that surveillance data for SPARROW components has not been available from which determinations of component shelf-life, etc., can be made.

12. For example, NOS Indian Head (responsible for SPARROW Electrical Power Unit (EPU) Gas Generator surveillance) has, since 1966, been attempting to procure AIM-7E EPU Gas Generators for surveillance sampling. The EPU samples were not made available in view of the size of the inventory stock. Procurement of these samples was deemed imperative as results from a report, reference (af), published on surveillance of a Gas Generator identical to the SPARROW unit except for grain length and environment indicated that the service life for this propellant formulation was four years. Catastrophic failure in the form of low-order detonations, and critically reduced burning times were reported. Since AIM-7E EPU units over four years old are currently in the Fleet, it is obvious of the importance and need for surveillance testing.

13. As the above is typical of the difficulty encountered in procuring samples for surveillance in the SPARROW program and in view of these deficiencies, the entire program suffers. It is, therefore, recommended that

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**TAB II-H**

the following procurement requirements of AIM-7E/7E2 components be considered for adoption.

<u>Nomenclature</u>	<u>Units Per</u>
GC and A (including subassemblies) AIM-7E/7E2	1.01
Propulsion MK-38/52	1.20
Electronic Firing Switch MK-73	1.10
Safety-Arming Device MK-5/35	1.10
Warhead MK-38	1.03

14. The above procurement is deemed necessary since, if a surveillance program is to support a missile program, the surveillance program must first be supported and supplied with the required assets to perform the surveillance. These policies should also be considered in procurement of the AIM-7F and associated missile components.

15. Another effect of present day procurement policies is evidenced in CINCPACFLT (C) message 030728Z of February 1968. The message states, in part, that, "... contingency planning for deployment in the Sea of Japan has demonstrated that stocks of AIM-7E SPARROW missiles and AIM-9D SIDE-WINDER missiles do not support the desired air-combat readiness posture in PACFLT." A factor contributing to this problem is that rocket motors rejected in SEA for minor discrepancies such as replacement of seals, repaint, etc., are being returned to CONUS for these minor repairs. It is logistically sound and practical that at least a minor motor repair facility be established at NAVMAG Subic Bay to reduce the number of motors in the SEA-CONUS-SEA repair pipeline. It is strongly recommended that the NAVMAG Subic Bay facility be expanded to include this minor motor repair capability.

16. A result of the quality surveillance program which should be investigated in the field of air-to-air missiles is that of removing from service any disposed of missile components, determined through the surveillance program to be unsuitable or ineffective for use. Such recommendations have been made in the past in some areas; however, extreme difficulty is encountered in obtaining approval to remove such units from the inventory.

17. For example, surveillance studies performed at NAD Crane indicate that the quality of MK-5-1 Safety-Arming Devices is marginal and total suspension has been recommended. The NAVAIRSYSCOMHQ has provided only limited concurrence and has suspended several production lots.

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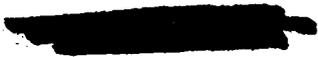
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18. It is recommended that the air-launched missile surveillance program now in effect be augmented to the fullest extent possible to first, adequately determine the quality level of the stockpile and second, to ensure that quality is upgraded and maintained at the highest possible level.

19. A properly managed surveillance program is necessary to provide data for the improvement of maintenance, rework, improved design, and final disposition action for these missile components. The present program is not managed in a manner to provide data from which to determine realistic component shelf life or service life.

20. The Navy presently has an in-house capability to perform a complete surveillance program on all air-launched weapons. Under a qualified in-service engineering activity, the Navy can effectively provide data that will ensure that the fleet receives a high quality missile system. This program should be performed at an Air Systems Activity such as NWC or NAV-MISCEN for all air-launched missile components.

21. Within a properly constituted in-service engineering facility, the program would include the complete missile system, i.e. airframe, guidance and control, warhead, target detective device, etc. All components of a missile system will be treated as an entity instead of, at present, fragmenting the missile surveillance program. To facilitate this program, an operational document must be issued that gives the in-service engineering facility the authority and direction to carry out its mission effectively.

22. Since the ground rules will be the same for all units, interface problems can be minimized. The activity assigned the management responsibility will function in three main areas of missile surveillance endeavors. The first is to provide a working, traceable, engineering foundation on which Quality Surveillance test specifications can be based. The second is to handle requests for problem solutions as they arise in any specific CNO, NAVAIRSYSCOM, Weapon Station or Fleet Operational Areas. The third is to initiate rework programs to upgrade the missile system and to provide missile component failure trends. The properly managed quality surveillance program should incorporate real world storage and operational environmental conditions. The present surveillance program takes a missile system and fragments its components at various NOS's and NAD's. Surveillance criteria are determined by each command and are usually quite different for each component. Attempts have been made by these commands to conduct surveillance under environmental conditions which approach the real world. However, the fact is that the real world environmental conditions have not been defined.

23. The major areas of missile component breakdown or induced hazard conditions due to the environment, are thermal, hygroscopic, dynamic corrosion, contamination and electromagnetic. Before we can even begin to provide



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TAB II-H

accurate missile surveillance we must determine the environment to which the missiles are subjected. Reference NWC TP 4464 Part 1, Part 2 and Part 3 which contain the environmental limitations in charts, technical limitations, and environmental frame of reference for the test engineer, designer, and project manager.

24. Environmental criteria are a major controlling factor in the design and missile service life determination of air-to-air missiles. The accepted criteria, as set forth in military specifications may be such that there are missiles that meet production test requirements, yet have failed under-going strenuous fleet environmental conditions. It is important, then, that the actual environment of missiles be studied to substantiate existing specifications or to revise the limitations in accordance with the real world situation. Reference (s) Tab J lists types of environmental conditions that have been studied and indicates areas that should be studied.

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DESCRIPTION OF DISCREPANCY	INVESTIGATIVE COMMENTS	ACTIVITY RESPONSIBLE
304 Contact Fuze indicates critical condition with primer firing.	304 Fuze is not needed since 303 will fire on contact too. The Air Force has discontinued use of the 304 Contact Fuze. Recommend that NWC Corona make a study of this action to determine if the 303 Fuze is reliable enough in contact firing to discontinue the use of the MK-304.	NWC Corona
Organizational Level Shore-base Sparrow handling equipment is inadequate. Assembled missiles are presently transported on locally devised trailers and are loaded onto aircraft utilizing MK6 Bomb and Torpedo Trucks.	Procure suitable trailers to transport assembled missiles over unimproved roads for distances up to three miles. Procure suitable missile loading equipment to permit safe expeditious loading of Sparrow Missiles onto F4 Aircraft fuselage missile stations. Aero 42A loader is available and an investigation into this loaders status and applicability should be made.	NAVAIR-534
Consolidation of failure data on Sparrow III applicable to USN/AF/U.K. is lacking.	Have a procedure set up whereby all Sparrow III failures applicable to all users USN/AF/U.K. be reported to a common point for transition to NavAir. A quarterly computer listing is currently promulgated by FMSAEG listing total parts replaced at the NARF by part number for all AIM-7s overhauled and further segregated by NAVY and AF. The lists shall be further expanded to include Federal Stock Number (FSN) to increase the usefulness of these data to SPCC, NAVAIR and NARF Planning Organizations.	FMSAEG

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TAB II-1

## TEST EQUIPMENT DISCREPANCIES

DESCRIPTION OF DISCREPANCY	INVESTIGATIVE COMMENTS	ACTIVITY RESPONSIBLE
<p>Test Equipment Procedures: Investigation has revealed an apparent need to up-date, standardize, and disseminate standard test procedures for the DPM-7, DSM-32, and DPM-14 Test Sets.</p>	<p>Form a Sparrow Missile Test Set Standardization Team composed of technically qualified people to compile and review all existing procedural deviations from applicable handbooks, HOIs, etc. It would be requested that all NARFs, NWSs and QELs send their current test procedures/test revisions in for review by the above team.</p>	NAVAIR 4103
<p>Calibration Procedures: Determine adequacy of Sparrow III Test Equipment, including Associated Measurements/Calibration documentation.</p>	<p>Reactivate committee concept established in 1965 for the purpose of making the above determination in order to recommend appropriate action needed to update present test equipment or recommend replacement, as required, including related documentation.</p>	NASCREPLANT/ PAC
	<p>Recommend coordinated effort of NAVAIRSYSCOM-REPAC/LANT Metrology Divisions to implement above action. Assistance to be solicited from all activities concerned. Suggest first meeting to be called in Sep. '68.</p>	
	<p>Discussion: AIM-7D/E test equipment review conducted by TEAM TWO at Raytheon Oxnard during 8-10 Oct. 1968. Recommendation concerning AN/DPM-7, AN/DPM-14, and AN/DPM-32 contained in basic report. In depth review of maintenance procedures and documentation was not attempted, however.</p>	
	<p>Action: Recommend NAVMISCEN Point Mugu be assigned the task to coordinate a standardization team for an in depth review of Sparrow test equipment.</p>	

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DESCRIPTION OF DISCREPANCY	INVESTIGATIVE COMMENTS	ACTIVITY RESPONSIBLE
Test Procedures: Adequacy of Sparrow Test Equipment calibration documentation.	A calibration requirements summary to review test equipment, calibration cycles, calibration concepts, and procedures. Area of review to encompass Fleet and NARF test equipment. NAVAIRSYSCOMREPLANT will coordinate effort and forward results and recommendations to NAVAIR. AIR-4103.	NAVAIRSYS-COMREPLANT ASCR 3210
	Discussion/Action: Initial review conducted at Raytheon Oxnard during 7 Oct. 1968 covering ADMRL listing for AIM-7D/E, AERO-1A, AWG-10, and LAU-17. NATSF (ESAC) will develop and maintain calibration requirements data and provide periodic status reports. The Metrology Requirements List, NAVAIR 17-35-MTL-1 will be revised to reflect initial review data.	
	NATSF (ESA), NAVPLANTREP Pomona (MEC) NAVMISCEN Point Mugu and NAVAIRSYSCOMREPS will coordinate to ensure development of required calibration documentation.	

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[REDACTED]

DESCRIPTION OF DISCREPANCY	INVESTIGATIVE COMMENTS	ACTIVITY RESPONSIBLE
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Degradation of Test Sets, DPM-7.

Immediately institute a total refurbishment program. These sets are now 12 years old and in desperate need of refurbishment. Follow this refurbishment program with a comprehensive correlation.

NARF and NAVAIRSYS-COMREPLANT/PAC

Discussion: All AN/DPM-7s were standardized and updated with the contractor installation of SEC-54 issued in 1964 to provide test capability for AIM-7E-2 missiles. SEC-1390 will be made by contractor field team. This change also requires incorporation of all SECs issued since 1964. Upon installation and acceptance each test set will be redesignated AN/DPM-7A.

Recommendations:

- a. Prior to contractor installation of SEC-1390 a NARF field team should calibrate and verify installation of all applicable AN/DPM-7 modifications/changes. Where required, necessary updating or sectional replacement will be accomplished by this team.
- b. NAVAIRSYS-COMREPS will maintain an inventory and status record for all missile test sets in their respective areas.
- c. All future SECs provide for change identification and Kit control by NAVAIRSYS-COMREPS.

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DESCRIPTION OF DISCREPANCY	INVESTIGATIVE COMMENTS	ACTIVITY RESPONSIBLE
<p>DPM-7 Calibration/Qualification: Metrology Publication and NAVWEPS 01-265GMAF-1 Sparrow handbook differ in calibration/qualification requirements. Does DPM-7 need "calibration", by whom, how often, who is certifying agent? Will "qualification" suffice as done at present by navy technicians? Does system performance check give adequate reliability?</p>	<p>Metrology publication requires updating. Recommend that procedures be promulgated for a periodic calibration by a certified calibration lab. NWS Yorktown feels that the present 30 day system performance check performed by NWS technicians is sufficient. Discussion: Calibration requirements for AN/DPM-7 reviewed during TEAM TWO test equipment meeting at Raytheon Oxnard 8-10 Oct. 1968 and amplified in basic report. Action: Periodic on-site calibration on a 6-month cycle of the entire AN/DPM-7 system is required. A specific procedure for calibration is under development for utilization by Navy Calibration Laboratories. NARF Alameda and Norfolk will provide calibration support pending issuance of procedure. Periodic calibration supplements 16-30DPM7-3 maintenance procedures. The Metrology Requirements List, NAVAIR 17-35MTL-1 will be revised by NATSF to reflect current documentation.</p>	<p>NAVAIRSYS-COM-REPLANT/PAC</p>
<p>Incompatibility of the DPM-7 and AIM-7E2. The DPM-7 tester is not compatible with AIM-7E-2 missile at present, due to ECP-54 not having been incorporated in the DPM-7s, located at NAS Cubic Point Missile Test Facility.</p>	<p>Recommend that ECP-54 be incorporated in DPM-7s immediately. Until above ECP is incorporated, recommend no further off-load of AIM-7E-2 missiles after 30 captive flights, since only valid tester is modified DPM-14 which is located aboard each ship which carries AIM-7E-2. Kit delivery started September 1968 with the initial kit delivered to NAVMAG Subic. Test set modification to be completed for all DPM-7s by December 1968.</p>	<p>NAVAIRSYS-COMAIR-4103</p>

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PERSONNEL/TRAINING DISCREPANCIES

DESCRIPTION OF DISCREPANCY

INVESTIGATIVE COMMENTS

ACTIVITY RESPONSIBLE

Naval Weapon Stations. With all-up missile delivery requirements the work load in missile processing will increase with no increase of manpower. BUPERS has made no changes to the manpower authorization to meet this increase in workload.

When all-up deliveries are required (Oct. '68 and Feb. '69), production of Sparrow and Sidewinder will be reduced merely because it takes more time to build an all-up-round than it takes to handle the G & C alone. A vertical project for air-launched weapons systems similar to the SMS project could protect NAVAIR'S interest in all phases of the systems from nuts and bolts to properly qualified personnel. NWSs will utilize military manpower exclusively for processing the all-up-round. It is recommended that a static civilian work force made up of Wage Board Employees be used at the NWSs to assist the military. This would provide cradle-to-grave continuity in the air-launch missile processing facilities.

NAVAIRSYS-COM-Long Range  
BUPERS-Short Range

Lack of qualified DPM-7/DSM-32 Maintenance personnel in Fleet, even after attending Maintenance Training schools.

NAMTRAGRU Memphis re-evaluate adequacy of present training courses and update as necessary. Request coordinate with NASCREPLANT/PAC. Fleet activities must screen personnel programmed for this maintenance training to ensure that the prerequisite of a good electronic background is had.

NAVAIR-4132-F

Sidewinder AIM-9D Test Set AN/DSM-78 Maintenance at NAVMAG Subic.

It is recommended that the nearest Calibration Laboratory be designated to maintain and calibrate the AN/DSM-78.

COMNAVAIR-PAC/NAVAIR-SYSCOMREPAC

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DESCRIPTION OF DISCREPANCY	INVESTIGATIVE COMMENTS	ACTIVITY RESPONSIBLE
<p>Carrier Missile Shops and NWS personnel are performing similar testing and handling functions. Assembly, test and maintenance of all sections, not just G &amp; C sections. NAMTRA-DETS are not equipped to handle ordnance type items.</p>	<p>Arrange to have some system established whereby carriers prior to deployment would send AOs, AQs and non-rated ordnance personnel to the nearest NAMTRADET or similar training activity for team training in every phase of ordnance handling. This training should provide team training of the entire system from stockpile to target.</p>	<p>NAVAIR-4103/ Type Commanders</p>
<p>Inexperienced personnel stationed onboard AEs and AOE's as well as personnel attached to CVAs and squadrons, are not familiar with the acceptable substitution components that can be used to assemble complete missiles.</p>	<p>The addition of a page or section to OD 16135 which would identify the acceptable component substitutions for the AIM-7E, AIM-7E-2, and AIM-9D. The present format of noun name, mark and Mod, and NALC should be followed.</p>	<p>NAVAIRSYS-COMHQ SPCC</p>

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CONTAINER DISCREPANCIES

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DESCRIPTION OF DISCREPANCY	INVESTIGATIVE COMMENTS	ACTIVITY RESPONSIBLE
<p>Shortage of G &amp; C Shipping Containers. Container Status 1 Aug. 1968 CONUS</p> <p>1,242 RFI 2,403 NON-RFI 1,365 IN USE 5,010 TOTAL</p>	<p>1. USN request USAF to expedite transfer of Zero type container to USN (approx. 2,500) and USAF excess Vendolator type containers (approx. 1,000).</p> <p>2. SPCC provision the Zero type container.</p> <p>3. Investigate the Zero type improvements and determine if these improvements can be retrofitted by the NWS to the Vendolator type container.</p> <p>4. Investigate adequacy of present packaging and handling procedures for air-to-air missiles. Relative merits of "turnaround" vs. "throw away" containers should be reevaluated.</p>	<p>NAVAIR PMA-232-12</p>
<p>Last USN procurement was in FY '63 and were of the "Vendolator" design. In FY '64 USN procured for USAF an improved container from Zero Mfg. Co. In 1966 USAF went to an all-up round type container and offered USN 2,550 of Zero type containers for free.</p>	<p>For over-the-road shipments from Concord (via truck) to Alameda, authorize use of wooden skids/pallets as presently used at Subic and on station Concord.</p>	<p>NAVAIR-4107</p>
<p>Continuing shortage of G &amp; C containers precludes use for local delivery to NARF and carriers at NAS Alameda.</p>		

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DESCRIPTION OF  
DISCREPANCY

INVESTIGATIVE COMMENTS

ACTIVITY  
RESPONSIBLE

An inadequate program exists for the management and control of missile containers.

More effective management control must be given to expensive missile containers. At the present, an effective accounting system is not in existence. Problems are created by CVAs loading missiles at one station and off-loading at another, causing a distribution problem. This situation has created a problem when attempting to return unserviceable missile components to rework. Suggest an accounting system similar to, but separate from, the AMMD accounting system, for high cost/critical AMMD containers only. For instance, an (ALFA) character container code beginning with "C" and excluding "O" and "I" would allow accounting for 13,824 different containers. Action has been taken.

NAVAIRSYS-  
COM/SPCC

RFI Containers are not available at NAVMAG Subic for shipment of non-RFI G & Cs Conus for repair.

Authorize using activities to utilize containers without all the latches. As an interim measure "Band" the coffin containers to ensure container integrity. Further direct SPCC to provide 100 containers per month to NAVMAG Subic. AIR 4103 immediately issue instructions, by message, to authorize the banding procedure.

NAVAIR 4103

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DESCRIPTION OF DISCREPANCY

INVESTIGATIVE COMMENTS

ACTIVITY RESPONSIBLE

G & C Logbooks are presently put into a compartment in the container that does not provide adequate physical security for the logbooks. The compartment covers are easily removed and knocked off in shipment allowing the logbooks to fall out or be removed.

Logbooks should be taped to the G & C skin with masking tape or olive drab ordnance tape prior to being placed into the container. This will totally preclude loss or mutilation of logbooks. Action has been assigned to NAVAIRSYSCOM at the Sparrow Symposium #10 and is not complete.

NAVMISCEN

Wooden and Metal Type Motor Containers for Sparrow/Sidewinder and AIM-9D Wing Container. These containers are subjected to moisture intrusion from environmental conditions and present a quality control problem for forward support areas and fleet. High humidity causes corrosion of exposed metal surfaces.

It is recommended that motors be packaged in Marvelseal barrier bags and desiccated prior to being placed in wooden or metal containers. Drawings and specifications will have to be developed for inclusion in all handbooks and QAPs. Sufficient funding and command attention will ensure that a \$40,000 missile is not delivered in packaging that was designed to save money and not the missile.

NAVAIR-4107

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DESCRIPTION OF DISCREPANCY	INVESTIGATIVE COMMENTS	ACTIVITY RESPONSIBLE
<p>All-Up-Round Containers:            Currently two USN activities are procuring the MK-12 Mod 2 AUR Container from two different contractors. Pre-production delivery is scheduled for 15 November 1968. Production delivery December 1968            Total buy: 1,440 containers.</p>	<p>Determine now if these containers are the same or will each require separate support. If support is determined to be separate, investigate the possibility of changing specifications to ensure that only one type container is provided by both manufacturers.</p>	<p>NAVAIRSYS-COM</p>

<p>Sparrow Warhead Container            MK 244 Mod 0: Rain and moisture entering container damaging S &amp; A device, firing switch and rusting warhead mating threads.</p>	<p>It is recommended that palletizing procedures utilized by NWSs and NAVMAGS be changed to require that a sheet of 1/4 inch exterior plywood be banded over the top of the warhead containers. This would reduce moisture intrusion in the forward areas to a minimum.</p>	<p>NAVAIR-4103</p>
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PUBLICATION DISCREPANCIES

DESCRIPTION OF DISCREPANCY	INVESTIGATIVE COMMENTS	ACTIVITY RESPONSIBLE
<p>Handbooks: Classified handbooks, such as assembly and testing are not available to shipboard personnel on a permanent basis. In some instances, personnel who normally make use, or should make use, of these books are not aware of their existence, simply because they are classified and are kept in office safes.</p>	<p>Declassify handbooks that are required to perform normal missile assembly/disassembly, loading, storage, testing, etc. Further declassify handbook individual test stations; i.e., rework manual. It is understood that paragraphs, such as missile theory, must be eliminated so that the information is still available. It is recommended that all Sparrow publications be listed in the first portion of each handbook with a short title. NAVAIRSYSCOM has initiated the preparation of technical manuals that will declassify all air weapons handbooks.</p>	NAVAIRSYSCOM
<p>MK6 Motors have been reworked and are not being used by the Fleet due to lack of confidence.</p>	<p>Provide an ALMB superseding previous bulletins concerned with MK6-3 problem. Explain actions taken in rework, results of tests, and assure using activities that "RGX" motors are completely reliable for unrestricted Fleet use. AIR-4103 should direct NAVMISCEN Point Mugu to issue subject ALMB.</p>	NAVAIR-4103
<p>Wing/Fins: Authorization to stencil wings with the letters "E" or "D" is non-existent. NWS Concord presently stencils all wings for ease of identification in processing and Fleet use.</p>	<p>QAP 008 and NAVAIR pubs. should be changed to require the stencilling of wings with an "E" or "D". Official action has been taken by NAVAIRSYSCOM and NWS's are complying with the requirement.</p>	NAVAIR-4103

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DESCRIPTION OF DISCREPANCY	INVESTIGATIVE COMMENTS	ACTIVITY RESPONSIBLE
Standard Operating Procedures (SOPs) are not being prepared and used by all activities.	Needed are SOPs for segregation, test, inspection, handling and packaging for Sparrow and Sidewinder. Ensure complete distribution to all Sparrow and Sidewinder handling activities, including NAVMAG Subic/NAS Cubic Point.	NAVAIRSYSCOM NAVORDSYSCOM

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MAINTENANCE DISCREPANCIES

DESCRIPTION OF DISCREPANCY	INVESTIGATIVE COMMENTS	ACTIVITY RESPONSIBLE
Excessive quantity of damaged MK38 Motor Fire Cables in that the connector which mates to the igniter often has broken pins and deformed threads.	Redesign the connector and cable. Subject connector has been redesigned by MDC and is currently being procured by NAVAIRSYSCOM on FY '69 missile procurements.	NAVAIR-5108A
NAVMISCEN submitted a proposed change recommending the elimination of the missile desiccant container. This item is a nuisance to the NARF's and if Mugu's analysis is correct, it should be eliminated. The validity of the purging requirement associated with the item is also questioned.	Expedite decision on proposed change within NAVAIRSYSCOM. (NAVAIRSYSCOM awaiting additional data from NAVMISCEN.)	NAVAIR-5108 NAVAIR-53322A
NARF Alameda has experienced a high failure rate on SRS Crystals for a long period of time. Suspect the Sparrow SRS is ineffective in the fleet. There is no test on this system except at the NARF's. Suspect stray radiation is damaging crystals.	NAVMISCEN expedite investigation of SRS failure rate. Request that the SRS be evaluated for need of more or improved tests to be made at NARF or field levels.	NAVAIR-53322A

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DESCRIPTION OF DISCREPANCY	INVESTIGATIVE COMMENTS	ACTIVITY RESPONSIBLE
ALMC-17 (Drip Loop Tie) is not adequate for long term solution (SPARROW).	Redesign to use a metal clip to hold cable rather than string. ECP-47 corrects this problem. ECP approval is expected November 1968 and will appear in production missiles approximately in December 1968. Retrofit will start at the NARF's six months after receipt of order for retrofit kits.	Raytheon Co. NAVAIR-4103
Replacement sections of SPARROW G & C units are not available at NAS Cubi Point missile test facility. This necessitates costly and time consuming return to CONUS of faulty G & C units, a large number of which could be adequately repaired locally. This would thereby shorten turn around time considerably.	Recommend spare radomes and target seeker sections be positioned at NAVMAG Subic/NAS Cubi in the following initial quantities: Radome - 20 Level Control Section - 50 Allowance Target Seeker Section - 50 Follow-up requisitions would adjust to usage experience. Spare radomes are currently available through the Navy supply system. The spare G & C units have not been procured by Navy and Navy currently has no plans for procuring spare units.	NAVAIRSYS-COMHQ SPCC COMNAVAIRPAC COMSERVPAC

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DESCRIPTION OF DISCREPANCY

INVESTIGATIVE COMMENTS

ACTIVITY RESPONSIBLE

Fleet spares. Wings/Fins and spare parts not being returned to NWS with the G & Cs upon CVA offload.

Develop and issue an off-load check list to all concerned. Use of Liaison personnel from appropriate NWS to assist and verify CVA off-load. The above was previously proposed as action item #10 5th Sparrow Symposium. Continuing problem which can be partially solved by establishment of team training concept.

NAVAIR-4103

Present policy permits lot sampling of major Sparrow components. In view of present difficulties is 100% QA inspection required?

Recommend 100% QA inspection of all major components. Paragraph 1.6.1 of QAP 008 permits lot sampling subject to workload. Recommend that Par. 1.6.1 of QAP 008 be suspended and require a 100% QA inspection of all Air-to-Air missile components.

FMA-32  
QAO-432  
ORD-935

Test Equipment Standardization and Aging. Doubt exists that all DPM-7s are identical in wiring and that actual wiring is identical to the schematics.

Refurbish, update, and standardize all DPM-7s in conjunction with modification for 7E-2 test capability. Call in and re-issue vice on-site work is recommended. DPM-7 Test Sets are currently being programmed to be replaced by All-Up-Round (AUR) test sets in approximately one year. Those facilities not requiring DPM-7 units shall be furnished DPM-14 test sets modified for AIM-7E-2 capability. The feasibility of extensive refurbishment of the DPM-7 should be weighed against progress with the All-Up-Round concept.

NAVAIR-4103  
REPLANT  
REPAC

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DESCRIPTION OF DISCREPANCY	INVESTIGATIVE COMMENTS	ACTIVITY RESPONSIBLE
<p>Retest After Failure-Procedures. FMSAEG INST. 8800/2 and other documents allude to retest of Sparrow missile after DPM-7 failure prior to rework or test set adjustment; however, no specific procedures are defined, or established. Retest after failure policy is a result of false reject. Should missile be accepted if retest is go on second test set? Should missile be accepted if retest is go on original test set?</p>	<p>Define exact procedures for retest after failure. Something such as the following should be included in the present documentation to provide guidance to the NWSs for standardization of testing AIM-7s.</p> <p>A G &amp; C which has failed test should, as a first step, be thoroughly checked out to ensure that it is correctly hooked up to the test set. As a second step, the G &amp; C should then be tested on a second test set, if available. If the G &amp; C fails on the second test set, it can be assumed that it is a No-Go G &amp; C. However, if a G &amp; C tests satisfactorily on the second test set, it should be retested on the first test set for the purposes of isolating whether the G &amp; C or test set is malfunctioning.</p>	<p>NAVAIR-5108C</p>

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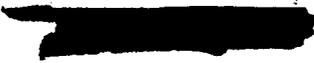
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- (b) NAVORDINST 4355.3 (CH-1) of 15 July 1966
- (c) BUWEPSINST 4355.29 of 15 April 1966
- (d) NAVORD letter ORD-044:WSK of 8 March 1967
- (e) NWC China Lake letter 5555/WJH:tt Ser. 4255 of 2 October 1968
- (f) NPP Indian Head (C) letter QASN-2/FCK:sdm 8811/2 (C-14) Ser. 0540 of 11 August 1966
- (g) NOS Indian Head letter TFS23/WSH 8811/2 of 30 August 1968
- (h) NPP Indian Head letter QASN-2/FGK:sdm 8811/2 (C-14) of 18 February 1966
- (i) NPP Indian Head letter QASN-2/FGK:sdm 8811/2 of 4 June 1966
- (j) NOS Indian Head letter TFS23/WSH 8811/2 of 10 September 1968
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- (l) NWS Concord (C) letter 60430:JEG:wr 8815 Ser. 0163 of 12 July 1968
- (m) NWS Concord (C) report QE/CO (SP III) 67-3 of March 1967
- (n) CINCPACFLT (C) Msg R030728Z of February 1968
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- (p) NAVAIRNOTE (C) 013010 of 20 March 1968
- (q) Institute for Defense Analyses Science and Technology Division, Research paper (C) P-369, "Environmental Temperature Specifications, Their Effects on Rocket Motor Cost and Performance (U)" December 1967
- (r) NOTS China Lake TP 4254 "Environmental Criteria Determination for Pyrotechnics" of April 1967

  
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- (s) NWC China Lake TP 4464 Part 1 and Part 2 "Environment of Criteria Determination for Air-Launched Technical Propulsion Systems" of July 1968
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- (u) NAVAIR (C) letter AIR-4107B:IK of 21 March 1968 "Sparrow III Explosive Components, Status of (U)"
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- (w) Quality Evaluation Laboratory Naval Weapons Station Concord, California Report (C) of June 1968 "Evaluation of AIM-7 (Sparrow III) Missile Components"
- (x) NAD Crane letter QEWG-LEK:grs 8811/1 of 15 October 1968
- (y) NOSC letter ORD-044:WSK of 8 July 1966
- (z) NWS Concord (C) letter 60430:JEG:fe 8810 Ser. 092 of 19 April 1968
- (aa) NWS Concord (C) letter 60430:JEG:wr 8810-0 Ser. 0291 of 28 September 1967
- (ab) NWS Concord (C) letter 60430:DJB/RDR:do 8810 Ser. 0165 of 3 July 1968
- (ac) NOS Indian Head letter TFS23/WSH 8811/2 of 25 July 1968
- (ad) SIDEWINDER GUIDED MISSILE SURVEILLANCE REPORT DATA (Technical Memorandum E-5-716)
- (ae) SPARROW III GUIDED MISSILE SURVEILLANCE REPORT (Technical Memorandum E-5- )
- (af) Picatinny Arsenal Technical Memorandum 1647 "Surveillance Characteristics of EPU Hawk Fuel" July 1965

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